



Chemical Standard Operating Procedure

All work involving materials classified as Particularly Hazardous requires the completion of Section 6.

Procedure Name		DNA/RNA Extraction Using Commercial Kits			
Procedure Author					
Name of Responsible Person					
Location to be Performed					
Creation Date			Review Date(s)		Revision Date(s)
1.	THIS STANDARD OPERATING PROCEDURE (SOP) IS FOR A:				
	<input type="checkbox"/> Specific laboratory procedure or experiment <ul style="list-style-type: none"> Examples: synthesis of chemiluminescent esters <input checked="" type="checkbox"/> Generic laboratory procedure that covers several chemicals <ul style="list-style-type: none"> Examples: distillation, chromatography <input type="checkbox"/> Generic use of a specific chemical or class of chemicals with similar hazards <ul style="list-style-type: none"> Examples: Organic azides, mineral acids, hydrofluoric acid 				
2.	DESCRIPTION: <i>Briefly describe how the chemical will be used.</i>				
	Describe the kit being used including manufacturer, title and catalog number				
3.	RISK IDENTIFICATION: <i>Identify potential safety hazards – refer to Section 2 of the SDS.</i>				
	<input type="checkbox"/> Explosive <input type="checkbox"/> Pyrophoric <input checked="" type="checkbox"/> Flammable (liquid, solid, gas or aerosol) <input type="checkbox"/> Self-Reactive <input type="checkbox"/> Peroxide Forming <input type="checkbox"/> Organic Peroxide <input type="checkbox"/> Oxidizing (liquid, solid or gas) <input type="checkbox"/> Water-Reactive <input type="checkbox"/> Compressed Gases <input type="checkbox"/> Cryogen <input checked="" type="checkbox"/> Corrosion to Metals <input type="checkbox"/> Radionuclides <input type="checkbox"/> Other: Click or tap here to enter text.		<input type="checkbox"/> Carcinogen <input checked="" type="checkbox"/> Sensitizer (respiratory and/or skin) <input checked="" type="checkbox"/> Irritant (skin and/or eye) <input checked="" type="checkbox"/> Corrosive (skin and/or eye damage) <input checked="" type="checkbox"/> Acute Toxicity (oral, dermal and/or inhalation) <input checked="" type="checkbox"/> Germ Cell Mutagen <input type="checkbox"/> Reproductive Toxicity <input checked="" type="checkbox"/> Specific Target Organ Toxicity: Single Exposure <input checked="" type="checkbox"/> Specific Target Organ Toxicity: Repeated Exposure <input checked="" type="checkbox"/> Other: Biohazard		
	Notes (include hazardous chemicals that will be used, additional cautions, permissible exposure limits, etc.):				
	Buffers may contain (select what applies to your lab – check SDS): <ul style="list-style-type: none"> Guanidine HCL 				



	<ul style="list-style-type: none"><ul style="list-style-type: none">○ Harmful if swallowed, harmful if inhaled, causes serious eye irritation, causes skin irritation, may cause drowsiness or dizziness● Guanidine thiocyanate<ul style="list-style-type: none">○ Harmful if swallowed, in contact with skin or if inhaled, causes severe skin burns and eye damage● Acetic acid<ul style="list-style-type: none">○ Flammable liquid and vapor, causes severe skin burns and eye damage, may be harmful if swallowed, toxic if inhaled, harmful in contact with skin.● Zinc chloride<ul style="list-style-type: none">○ Harmful if swallowed, causes severe skin burns and eye damage, may cause respiratory irritation.● Sodium azide (particularly hazardous chemical)*<ul style="list-style-type: none">○ Fatal if swallowed, fatal in contact with skin, fatal if inhaled, may cause damage to organs through prolonged or repeated exposure.● Cetrimonium Bromide<ul style="list-style-type: none">○ Harmful if swallowed, causes skin irritation, causes serious eye damage, may cause respiratory irritation, may cause damage to organs through prolonged or repeated exposure if swallowed.● Proteinase K<ul style="list-style-type: none">○ May cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing difficulties if inhaled.● 1,2,4-triazole<ul style="list-style-type: none">○ Harmful if swallowed, causes serious eye irritation, suspected of damaging fertility or the unborn child.● Sodium perchlorate (particularly hazardous chemical)*<ul style="list-style-type: none">○ May cause fire or explosion, strong oxidizer, harmful if swallowed, causes serious eye irritation, may cause damage to organs through prolonged or repeated exposure.● Phenol<ul style="list-style-type: none">○ Toxic if swallowed, toxic in contact with skin, causes severe skin burns and eye damage, toxic if inhaled, suspected of causing genetic defects, may cause damage to organs through prolonged or repeated exposure.● Chloroform (particularly hazardous chemical)*<ul style="list-style-type: none">○ Harmful if swallowed, causes skin irritation, causes serious eye irritation, toxic if inhaled, may cause drowsiness or dizziness, suspected of causing cancer, suspected of damaging the unborn child, causes damage to organs through prolonged or repeated exposure.● DMSO<ul style="list-style-type: none">○ Combustible liquid● Methanesulfonic acid<ul style="list-style-type: none">○ May be corrosive to metals, harmful if swallowed, harmful in contact with skin, causes severe skin burns and eye damage, may cause respiratory irritation.
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	<ul style="list-style-type: none"> • Sulfuric acid <ul style="list-style-type: none"> ○ May be corrosive to metals, causes severe skin burns and eye damage, causes serious eye damage. • Triton-X100 <ul style="list-style-type: none"> ○ Harmful if swallowed, causes serious eye damage. • Benzalkonium chloride <ul style="list-style-type: none"> ○ Toxic if swallowed, harmful in contact with skin, causes severe skin burns and eye damage. <p>Chemicals required in addition to kit:</p> <ul style="list-style-type: none"> • Isopropanol – may be used in buffers <ul style="list-style-type: none"> ○ Highly flammable liquid and vapor, causes serious eye damage, may cause drowsiness or dizziness. • Ethanol – may be used in buffer <ul style="list-style-type: none"> ○ Highly flammable liquid and vapor, causes serious eye irritation, causes damage to organs through prolonged or repeated exposure. • 2-mercaptoethanol (particularly hazardous chemical)* – may be used in buffers <ul style="list-style-type: none"> ○ Combustible liquid, toxic if swallowed or if inhaled, fatal in contact with skin, may cause an allergic skin reaction, causes serious eye damage, may cause damage to organs through prolonged or repeated exposure if swallowed. OSHA PEL TWA (8-hour) = 0.2 ppm <p>* In identifying PHC for a laboratory, it is necessary to consider the nature of the hazard. Check SDS – particularly hazardous characteristics may vary based on form and concentration</p>
4.	<p>WHAT ENGINEERING CONTROLS WILL BE USED TO MINIMIZE EXPOSURES TO THESE HAZARDS? <i>select all that apply</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Fume Hood <input type="checkbox"/> Snorkel <input type="checkbox"/> Glove Box <input type="checkbox"/> Clean Room <input type="checkbox"/> Explosion Shielding <input type="checkbox"/> Splash Shielding <input type="checkbox"/> Beta Shielding <input checked="" type="checkbox"/> Safety Storage Cabinet (for flammables) <input type="checkbox"/> Flammable Storage Refrigerator <input type="checkbox"/> Other: Click or tap here to enter text.
5.	<p>WHAT PERSONAL PROTECTIVE EQUIPMENT IS REQUIRED TO MINIMIZE THESE HAZARDS? <i>select all that apply</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Safety Glasses <input checked="" type="checkbox"/> Lab Coat <input type="checkbox"/> Fire-Resistant Lab Coat <input checked="" type="checkbox"/> Gloves - specify type: nitrile (check compatibility charts) – do not use latex with EtBr <input type="checkbox"/> Acid Resistant Gloves



	<input type="checkbox"/> Acid Resistant Apron <input type="checkbox"/> Face shield <input type="checkbox"/> Other: Click or tap here to enter text.										
6.	<p>STEP-BY-STEP OPERATING PROCEDURE</p> <p><i>Provide a sequential description of work, including as much detail as possible such as designated work area(s), chemical concentrations ranges and amount used (mass, volume) and when special safety equipment is to be utilized. Include temperature, pressure, and other experimental conditions if possible. Pictures and schematics are recommended for complex setups. Highlight the steps with the highest hazards.</i></p> <p>Refer to kit instruction manual manufacturer, title, catalog #. Must highlight designated work area when handling particularly hazardous materials.</p>										
7.	<p>TRANSPORT, RECEIVING AND STORAGE REQUIREMENTS</p> <p><i>Describe transport, receiving and storage requirements. Include secondary containment, transport devices (carts, carriers, etc.), segregation requirements, any special temperature or atmospheric requirements, and container compatibility requirements. Information may be included in Section 6.</i></p> <table border="1"> <thead> <tr> <th>Chemical name</th> <th>Storage location/requirement</th> </tr> </thead> <tbody> <tr> <td>Buffer name</td> <td> Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators). </td> </tr> <tr> <td>Buffer name</td> <td> Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators). </td> </tr> <tr> <td>Buffer name</td> <td> Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators). </td> </tr> <tr> <td>Ethanol</td> <td> Storage location Store in approved flammable storage away from extreme heat, ignition sources </td> </tr> </tbody> </table>	Chemical name	Storage location/requirement	Buffer name	Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators).	Buffer name	Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators).	Buffer name	Storage location and requirements (from SDS) For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators).	Ethanol	Storage location Store in approved flammable storage away from extreme heat, ignition sources
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		or open flames. Keep away from oxidizers, acids and bases. For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators).						
	Isopropanol	Storage location Store in approved flammable storage away from sources of ignition. Avoid storage near extreme heat, ignition sources or open flames. Keep away from oxidizers, acids and bases. For cold storage of flammables only certified flammable refrigerators must be used (no household refrigerators).						
	2-mercaptoethanol	Storage location Store away from oxidizing agents and metals. Containers which are opened must be carefully resealed and kept upright to prevent leakage. 2-mercaptoethanol spills are often mistaken for a natural gas leak						
8.	WASTE DISPOSAL							
	Type of waste generated by this procedure/process (<i>check all that apply</i>): <input checked="" type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid							
	Waste hazard determination (<i>check all that apply</i>):							
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	Expected waste generation per experiemntal run (mass/volume):							
	Disposal procedure and location of Satellite Accumulation Area:							
	<ul style="list-style-type: none"> DNA/RNA extraction liquid wastes must be disposed as hazardous waste. Store in closed containers in the Satellite Accumlation Area located XXX. Use spill resistant waste containers with yellow sticker labeled "Hazardous Waste". The label will include all constituents of the waste, percentages and hazard determination. When ready, schedule waste pickup through EHS. 							



	<p>Dispose of used pipette tips and tubes as biohazardous waste when applicable as long as no other hazardous materials are also present in the waste. Pipette tips and tubes in contact with phenol/chloroform containing solutions must be handled as hazardous waste. Containers holding these wastes on the benchtop or in the satellite accumulation area must be clearly labeled as hazardous waste and closed when not actively in use.</p>
<p>9.</p>	<p>EMERGENCY PROCEDURES <i>Indicate how spills, personnel exposure/injury, and other accidents should be handled and by whom.</i></p> <p>Life-threatening emergencies (fire, explosion, large-scale spill or release)</p> <ul style="list-style-type: none"> • ACTIVATE THE BUILDING’S FIRE ALARM SYSTEM IF THE SPILL REPRESENTS A THREAT TO HUMAN LIFE OR MAY CAUSE A FIRE OR EXPLOSION. • Notify all persons in the workspace that a spill has occurred and evacuate all personnel from the workspace to a safe location. • Isolate the work space to prevent inadvertent entry: lock any access doors, place signs on doors reading “DO NOT ENTER-CHEMICAL SPILL” • Call EHS at 392-8400 for clean-up assistance. If the emergency occurs outside of normal work hours, contact the University Police Department at 392-1111. <p>Personnel exposure (refer to SDS):</p> <ul style="list-style-type: none"> • BBP Needlestick & BBP Splash Exposures: call Needlestick Hotline at 1-866-477-6824 (OUCH). Immediately after evaluation/treatment, employees should contact AmeriSys at 1-800-455-2079. Report incident to EHS. • <u>Chemical contact with skin:</u> Remove contaminated clothing and jewelry and wash affected area with plenty of soap and water. The emergency shower is located XX. If skin irritation or rash occur get medical advice. Report to EHS. • <u>Chemical contact with eyes:</u> Remove contact lenses. Flush with water for 15 min in eyewash station located XX. Irrigate eyes thoroughly while lifting eyelids. Seek medical advice if necessary. Report to EHS. • <u>Chemical ingestion:</u> Rinse mouth with water (do not swallow). Never make an unconscious person vomit or drink fluids. Call poison control center and obtain medical assistance if you feel unwell. Report to EHS. • <u>Chemical inhalation:</u> If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison control center and obtain medical assistance if you feel unwell. Report to EHS. <p>In the event of a spill that can be cleaned up by local personnel:</p> <ul style="list-style-type: none"> • Notify personnel in the area and restrict access. Eliminate all sources of ignition. • Review the SDS for the spilled material to determine the appropriate level of protection. Minimum protection should include gloves, safety glasses and lab coat. • Wearing appropriate personal protection equipment, clean up spill using the lab’s spill kit located at XX. Collect spill cleanup materials in a tightly closed container and label appropriately as hazardous waste. Wipe area with soap and water.



- If a small 2-mercaptoethanol spill occurs that causes an odor issue, open the lab chemical fume hood sashes to maximize flow, leave the lab and make sure the exterior lab door remains closed (do not prop open) to allow proper negative pressure ventilation of the lab. Contact EHS for assistance.

Emergency contact numbers:

Lab Manager	xxx-xxx-xxxx
Building Manager	xxx-xxx-xxxx
Principal Investigator	xxx-xxx-xxxx
Poison Control Center	800-222-1222
Emergency	911
EHS	352-392-1591